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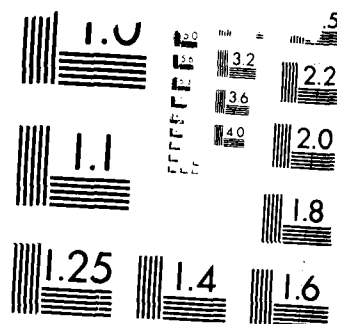
NAVAL WEAPONS STATION SEAL BEACH FLEET MOORINGS  
INSPECTION REPORT(U) NAVAL FACILITIES ENGINEERING  
COMMAND WASHINGTON DC CHESAPEAKE DIV SEP 84  
CHES/NAVFAC-FPO-1-84(29) F/G 1

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# NAVAL WEAPONS STATION SEAL BEACH FLEET MOORINGS INSPECTION REPORT

AD-A168 654

SEPTEMBER 1984

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OCEAN ENGINEERING  
AND CONSTRUCTION PROJECT OFFICE  
CHESAPEAKE DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
WASHINGTON, DC 20374

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This report contains the results of inspection of 12 fleet moorings (15 buoy systems) located within the NWS Seal Beach, CA, harbor complex. A CHESNAVFACENGCOM-assigned Engineer-in-Charge & divers from Underwater Construction Team Two conducted the inspection from 30 July to 2 August 1984. (Con't)

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Of the 15 buoy systems inspected, only one (Oscar 7) was found to be in good condition. The top jewelry and padeyes of four buoys (Oscar 2, 3, and 4 and Alpha 2) are in unsatisfactory condition and must be replaced if these moorings are to remain in service.

Two buoys, Oscar 5 and Oscar 7, are listing about 45 degrees and could be taking on water. Since these two buoys could be in danger of sinking, they should be brought ashore as soon as possible and the cause of the lists determined and corrected.

Detailed information and specific comments concerning each of these moorings are included within this report.

# ABSTRACT

This report contains the results of inspection of 12 fleet moorings (15 buoy systems) located within the NWS Seal Beach, California; harbor complex. A CHESNAVFACENGCOM-assigned Engineer-in-Charge and divers from Underwater Construction Team Two conducted the inspection from 30 July to 2 August 1984.

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U.S. NAVAL WEAPONS STATION (NWS)  
SEAL BEACH  
FLEET MOORING UNDERWATER INSPECTION REPORT

1.0 INTRODUCTION

1.1 Background. Under the COMNAVFACENGCOM Fleet Mooring Maintenance (FMM) Program, CHESNAVFACENGCOM has been assigned the responsibility to plan and conduct periodic diver inspections of all fleet moorings worldwide. In carrying out this responsibility, CHESNAVFACENGCOM designated an Engineer-In-Charge (EIC) to provide inspection planning and onsite technical direction for the underwater inspection of fleet moorings at NWS Seal Beach. The actual underwater portion of the inspection was performed by divers of Underwater Construction Team Two (UCT TWO). The inspection of these moorings was conducted from 30 July to 2 August 1984.

1.2 General Description. The NWS Seal Beach operates and maintains a total of 12 fleet moorings (15 buoy systems), all of which are located within the NWS Harbor Complex. Figure 1 depicts the geographic position of each of the 12 moorings. Eight, designated Oscar 1 through Oscar 8, are installed in the outer harbor, but inside the east and west jetties. Three of these are located to the west of the main entrance channel and five to the east of the channel. The remaining four fleet moorings are located in Anaheim Bay, the inner harbor located within two beach fill areas. Two of these are comprised of a three buoy system, designated Echo 1 through Echo 3, which are installed in the southwestern portion of Anaheim Bay. The final two, which are bow/stern moorings, are designated buoy systems Alpha 1 through Alpha 4 and are located in the eastern portion of Anaheim Bay.

1.3 Moorings Classifications. Based on the original wire diameter of the chain installed, these moorings meet the requirements of either a Class B or Class C mooring system. However, in actuality, these moorings are used by NWS Seal Beach personnel as Class E and Class F moorings. Table 1 depicts both the as-built and as-used classifications of each of these moorings.

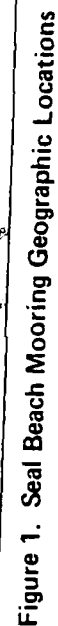


TABLE 1

## NWS SEAL BEACH MOORING CLASSIFICATIONS

MOORING	AS-BUILT CLASSIFICATION	AS-USED CLASSIFICATION
01	C	E
02	C	E
03	C	E
04	B	E
05	B	E
06	B	E
07	B	E
08	B	E
E1	B	F
E2	C	F
E3	B	F
A-1	B	E
A-2	B	E
A-3	C	E
A-4	C	E

## 2.0 INSPECTION PROCEDURES

2.1 Inspection Objectives. The purpose of the mooring inspections was to determine the general condition of the buoys and chain assemblies and, when possible, to verify or update existing as-built and maintenance records. Divers inspected only a portion of the submerged buoy hull and chain assemblies in order to compile a general description of the mooring's condition. The existence of fairly consistent measurements during this inspection provides a good indication of the mooring's overall condition. It should be kept in mind that periodic underwater inspections are intended as an expedient and relatively inexpensive supplement to accurate maintenance records.

2.1.1 Chain Wire Diameter Measurements. Chain wire diameter measurements were used to evaluate the condition of a mooring. A selective sampling of the wire diameter of chain links and connecting hardware was taken in order to determine the amount of deterioration due to corrosion and wear. At each sampling area, the chain was cleaned to bare metal. Single-link measurements were taken where the chain was slack to detect corrosion loss. Double-link measurements were taken where two links connected under tension to detect the combined effects of corrosion and wear. Chain links and other components which measured 90 percent or greater of original wire diameter are considered to be in "good" condition; measurement between 80 and 90 percent of original diameter is considered "fair" condition; any measurement less than 80 percent is considered "poor" and is cause for the mooring to be declared unsatisfactory for fleet use.

2.1.2 Inspection Limits. Standard underwater inspection procedures do not call for the inspection of any part of the mooring which has been buried or which is below a water depth of 130 feet if scuba gear is used. Anchor chain and riser subassemblies were observed only to the point at which they became buried; no attempt was made to locate and inspect anchors or other mooring materials which were not readily visible.

## 2.2 Buoy

2.2.1 Buoy Topside. Each buoy was inspected to determine its general condition. The buoy markings were checked for conformance to those noted in applicable charts. Physical damage such as holes, dents, or listing was described. Hatches, openings, and penetrations were examined and worn material and rust were reported.

The buoy fenders and chafing strips were checked for integrity and secure connection to the buoy. Buoy top jewelry was measured with calipers to find the overall outside dimensions and areas of most severe reduction in wire size.

2.2.2 Buoy Lower Portion. Divers inspected the buoy below the waterline, recorded the thickness of marine growth, and noted the condition of the buoy bottom.

2.3 Riser Chain Subassembly. To determine chain wear, each riser chain was inspected by taking three consecutive double-link measurements at both ends and at the center of the riser, using pre-cut gauges and/or calipers. To determine original chain size, divers took single-link measurements of the wire diameter and measured the link length (link length should be six times the wire diameter).

2.4 Anchor Chain Subassembly. Using pre-cut gauges and calipers, UCT TWO divers took sample measurements of these subassemblies. Most of this chain was found to be in satisfactory condition.

## 3.0 INSPECTION SUMMARY

An in-depth discussion of the inspection results is contained in Annex A; Annex B contains buoy location survey data; Annex C contains onsite photographs; and Annex D contains a copy of the preliminary report of the inspection results. An evaluation of the information gathered during the inspection indicates the following:

- o Of the 15 buoy systems inspected, one (Oscar 7) was found to be in good condition. Four buoy systems are in unsatisfactory condition because some of the top jewelry and padeyes are less than 80 percent of original wire diameter and must be replaced before these moorings can be returned to service. These moorings are Oscar 2, 3, and 4 and Alpha 2. Table 2 presents the current status of NWS Seal Beach fleet moorings.
- o Buoys Oscar 5 and Oscar 7 are listing badly. One or more compartments of these buoys could be taking on water and the buoys could be in danger of sinking. These buoys should be brought ashore as soon as possible and the cause of their lists determined and corrected.
- o Buoys Oscar 1 and 8, Echo 1, and Alpha 3 are in fair condition due to rust and general deterioration and should be refurbished.
- o The top tension bar eye of buoy Alpha 4 is worn to almost 80 percent of its original wire diameter. This tension bar should be repaired as soon as practical. Any further wear may reduce the eye to below 80 percent and render the mooring unsatisfactory for fleet use.
- o Anchor chain subassembly A of mooring Alpha 2 is worn to less than 80 percent of its original wire diameter. This subassembly is unsatisfactory and should be replaced before this mooring is returned to service.
- o Moorings Oscar 6, Echo 2 and 3, and Alpha 1 have riser and/or anchor chain assemblies worn to within 80 and 90 percent of their original wire diameters. These moorings, however, are in satisfactory condition for continued use in their current capacity as Class E or F moorings.
- o Most of the anodes observed have eroded considerably. Plans should be made to replace these anodes in the near future.

TABLE 2

## NWS SEAL BEACH INSPECTION SUMMARY

Mooring Number	Condition			Comments
	Good	Fair	Poor	
Oscar 1		X		Buoy needs to be refurbished.
Oscar 2			X	Top jewelry badly worn. Top tension bar padeye worn to about 50 percent of original size.
Oscar 3			X	Top tension bar padeye and attached spider plate worn to 50 percent of original wire diameter.
Oscar 4			X	Top tension bar padeye and attached spider plate worn to less than 80 percent.
Oscar 5		X		Buoy needs to be refurbished. Riser chain worn to between 80 and 90 percent. Buoy listing badly.
Oscar 6		X		Anchor chain subassembly B worn to between 80 and 90 percent.
Oscar 7	X			Buoy listing about 45 degrees. The cause of this list should be investigated. Visible chain in good condition.
Oscar 8		X		Buoy needs to be refurbished.
Echo 1		X		Buoy needs to be refurbished.

TABLE 2 (cont'd)

## NWS SEAL BEACH FLEET INSPECTION SUMMARY

Mooring Number	Condition			Comments
	Good	Fair	Poor	
Echo 2			X	Riser and anchor chain assemblies worn to between 80 and 90 percent. Prior inspection measured anchor assemblies below 80 percent.
Echo 3		X <sup>1</sup>		Anchor chain subassembly worn to between 80 and 90 percent.
Alpha 1		X		Riser and anchor chain subassemblies worn to between 80 and 90 percent.
Alpha 2			X	Top tension bar padeye badly worn. Anchor chain subassembly A worn below 80 percent.
Alpha 3		X		Buoy needs to be refurbished.
Alpha 4		X		Top tension bar eye worn to almost 80 percent.

<sup>1</sup> Although the buoy and riser chain subassembly were found to be in good condition, the three anchor chain subassemblies are buried and inaccessible to divers. Since the anchor chain subassemblies of moorings, Echo 1 and Echo 2 (which were installed at the same time as Echo 3) are worn, it is assumed that the anchor chain subassemblies of Echo 3 are probably in similar condition which justifies reducing Echo 3 to a "fair" condition.



## ANNEX A

### MOORING INSPECTION RESULTS

This annex contains the following for each mooring:

- o a summation of the inspection data obtained by the CHESNAVFACENGCOM EIC and the UCT TWO divers; and
- o a diver data reporting form.

## INSPECTION RESULTS

### OSCAR ONE

#### Buoy

This is a 10-foot-diameter drum-type buoy with a tension bar and a 5-foot freeboard. The top and bottom fenders and the chafing rail are made of timber which is badly deteriorated. The buoy's top and bottom hardware appear to be in satisfactory condition, but the sides of the buoy are covered with a light rust.

#### Riser Chain Subassembly

The original wire diameter of the riser chain was 2 3/4 inches, much larger than that required for a Class E mooring. Double-link measurements, taken at the top, middle, and bottom of the riser chain, indicate that the chain links are greater than 90 percent of their original wire size. The ground ring was located at a depth of 30 feet, near the bottom under the tidal condition existing at the time of this inspection.

#### Anchor Chain Subassemblies

These three subassemblies are buried in the bottom and are not available for visual inspection.

#### Cathodic Protection

Underwater voltmeter readings measured the cathodic protection to be between -.89 volts on the buoy and -.65 volts on the riser chain near the ground ring.

#### Conclusions/Recommendations

The buoy needs to be refurbished, but the mooring is in satisfactory condition for continued use in its current capacity as a Class E mooring.

MOORING NO.: OSCAR 1 CLASS: E LOCATION: AL'S SEAL BEACH LAT: 33° 43' 41" N LONG: 115° 05' 52" W  
 BUOY TYPE: DEEP 6' DIA ANCHOR SIZE/TYPE: 2" I WATER DEPTH: 33' VISIBILITY: 2' BOTTOM TYPE: SILT/SAND  
 DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J.A. THURNTON DIVERS: HARDING/MANNA (0521-0847 HRS)

COMPONENTS	GAUGE SIZE	CONDITION							COMMENTS	
		LINK LENGTH	SINGLE LINK %		DOUBLE LINK %			DEPTH		
			90+	80+	80-	90+	80+			80-
BUOY HARDWARE	TOP 2 1/4" PAD EYE								BUOY HAS TENSION BAR AND SITS HIGH IN WATER. 5' OF FREEBOARD. BUOY IS COVERED WITH LIGHT RUST CL SIDES. TOP DECK HAS LIGHT GLASS COVER. WOOD FIDERS/CHAFING RAILS BADLY DETERIORATED.  ACCESSORIES BETWEEN RISER CHAIN AND GRABED RING - 2 3/4" DETACH, 2 1/2" B LINK, 2 1/2" C LINK, 3" WACE DETACH	
	2" SANDER PLATE									
	1 3/4" PEAR (2)									
	BOTTOM - 3" DETACH									
RISER	2 1/2" SHACKLE									
	NEAR BUOY	2 3/4"	✓✓✓		✓✓✓			8'	-83	
	MIDDLE	↓	✓✓✓		✓✓✓			18'		
	NEAR GRD RG	↓	✓✓✓		✓✓✓			27'	-65	
GROUND	GROUND RING	4 1/2" x 18" INSIDE DIAMETER						30'	-69	
	UPPER END									
	MIDDLE	BURIED								
	ENTERS BOTTOM									
GROUND LEG NO. A	UPPER END									
	MIDDLE	BURIED								
	ENTERS BOTTOM									
	UPPER END									
GROUND LEG NO. B	UPPER END									
	MIDDLE	BURIED								
	ENTERS BOTTOM									
	UPPER END									
GROUND LEG NO. C	UPPER END									
	MIDDLE	BURIED								
	ENTERS BOTTOM									
	UPPER END									

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

## INSPECTION RESULTS

### OSCAR TWO

#### Buoy

This is a 10-foot-diameter peg-top buoy with a 42-inch freeboard. The fenders and chafing strip are rubber and in good condition. The sides and top deck are covered with moderate to heavy rust and the top jewelry is badly worn and in poor condition. In addition, the top padeye of the tension bar is worn to about 50 percent of its original 3-inch wire diameter.

#### Riser Chain Subassembly

Double-link measurements of this chain were between 80 and 90 percent of the original 2 3/4-inch wire diameter which is considerably larger than required for its use as a Class E mooring.

#### Anchor Chain Subassemblies

About 2 feet of each of the three subassemblies was visible before they entered the bottom. The upper end of each of these subassemblies was measured to be greater than 90 percent of its original wire diameter.

#### Cathodic Protection

Underwater voltmeter readings measured the cathodic protection to be between -.82 volts on the buoy to -.69 volts at the upper end of anchor chain subassembly B.

#### Conclusions/Recommendations

Due to the poor condition of the top jewelry and upper padeye, this mooring is considered to be unsatisfactory for further fleet use. This mooring should be removed from service and overhauled at the nearest practical time.

MOORING NO.: CISCAR 2 CLASS: E LOCATION: NIL'S SEAL BEACH LAT: 35° 43' 45.3" N LONG: 113° 05' 42.5" W  
 BUOY TYPE: REG TOP (W/DIAH) ANCHOR SIZE/TYPE: A I WATER DEPTH: 39' VISIBILITY: 2' BOTTOM TYPE: SILT/SAND  
 DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J.A. THEODOROU DIVERS: HARDING/HALL (1050-1144 HRS)

COMPONENTS		GAUGE SIZE	CONDITION					COMMENTS
		LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH	
			90+	80+	80-	90+	80+	80-
BUOY HARDWARE	TOP- 3" PADEYE							CPS WELDS
	3 1/2" SHACKLE							-83
	BOTTOM- 3" B LINK							
	3" C LINK							
	2 1/2" DETACH							
RISER	NEAR BUOY	2 3/4"	✓				✓✓	-81
	MIDDLE	↓	✓✓✓				✓✓	-79
	NEAR GRD RG	↓	✓✓✓			✓✓		-72
GROUND RING		4 1/2" x 19"	INSIDE DIAMETER					
BENCH GROUND LEG NO. A	UPPER END	2 1/2"	✓✓✓					-72
	MIDDLE							
	ENTERS BOTTOM							
BENCH GROUND LEG NO. B	UPPER END	2 1/2"	✓✓✓					-69
	MIDDLE							
	ENTERS BOTTOM							
BENCH GROUND LEG NO. C	UPPER END	2 1/2"	✓✓✓					-72
	MIDDLE							
	ENTERS BOTTOM							
BENCH GROUND LEG NO. C	UPPER END	2 1/2"	✓✓✓					-72
	MIDDLE							
	ENTERS BOTTOM							

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

## INSPECTION RESULTS

### OSCAR THREE

#### Buoy

This is a 12-foot-diameter peg-top buoy with a 42-inch freeboard. About 25 percent of its wooden fenders and chafing strip are badly deteriorated, and there is a light coating of rust on the sides near the waterline. The top tension bar padeye and attached spider plate are both worn to less than 50 percent of their original wire diameter. There is about 5 inches of marine growth on the bottom of the buoy.

#### Riser Chain Subassembly

Double-link measurements of the upper portion of the riser chain were between 80 and 90 percent of its original wire diameter. Several fishing lines were intertwined with the riser.

#### Anchor Chain Subassemblies

Approximately 5 feet of each subassembly was visible before the chain entered the bottom. Double-link measurements of these chains were between 80 and 90 percent of their original wire diameter.

#### Cathodic Protection

Two anodes, about 40 percent of their original size, were located on the buoy. Underwater voltmeter readings measured the cathodic protection to be between -.80 volts on the buoy to -.62 volts on the lower portion of the riser chain subassembly.

#### Conclusions/Recommendations

Due to the poor condition of the top jewelry and padeye, this mooring is in unsatisfactory condition for further fleet use. This mooring should be removed from service and overhauled at the earliest practical time.

MOORING NO. 02AR 5 CLASS: E LOCATION: NEAR SEAL BEACH LAT: 33°43'50.1"N LONG: 118°05'40.2"W

BUOY TYPE: PEE TOP ANCHOR SIZE/TYPE: A-1 WATER DEPTH: 42' VISIBILITY: 2' BOTTOM TYPE: SILT/CLAY

DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: SAKO/CICCONI (1449-1538 HRS)

COMPONENTS	GAUGE SIZE	CONDITION							COMMENTS	
		LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH			
			90+	80+	80-	90+		80+		80-
TOP 3" PAD EYE									BUOY HAS 36" FREEBOARD, SPIDER PLATE AND TOP PAD EYE WELDED TO 50% ABOUT 3/4 OF ABOVE FIDERS/CHAINS STEPS IN GOOD CONDITION, LIGHT RUST ON SIDES AT WATER LINE, MINOR CORROSION 5" BOTTOM, FISHING LINES INTERNALLY WITH RISER, TWO ALGAE (3" x 2" x 2") 40% OF ORIGINAL SIZE ON BUOY. ACCESSORIES BETWEEN RISER CHAIN HAD GROUND RING - 3 1/4" DETACH, 3 1/2" END LINK, 3" CLIP, 4" WACO DETACH.	
3" SPIDER PLATE										
PATCH 3 1/2" DETACH										
2 1/2" PEARL										
2 3/4" DETACH										
RISER	NEAR BUOY	2 3/4"	✓✓✓					✓✓✓	-65	8'
	MIDDLE	↓	✓✓✓				✓✓✓	✓✓✓	-69	23'
	NEAR GRD RG	↓	✓✓✓				✓✓✓	✓✓✓	-62	38'
GROUND RING	5 1/2"	↓	✓✓✓							38'
BRACED GROUND LEG NO. A 0206	UPPER END	5 1/2" x 15 1/2"	INSIDE DIAMETER					✓✓✓		42'
	MIDDLE							✓✓✓		
	ENTERS BOTTOM									
BRACED GROUND LEG NO. B 140	UPPER END		✓✓✓					✓✓✓		42'
	MIDDLE									
	ENTERS BOTTOM									
BRACED GROUND LEG NO. C 0206	UPPER END		✓✓✓					✓✓✓		42'
	MIDDLE									
	ENTERS BOTTOM									
BRACED GROUND LEG NO. C 0206	UPPER END		✓✓✓					✓✓✓		42'
	MIDDLE									
	ENTERS BOTTOM									
GROUND RING TO EXHAUST - 1"										
WACO DETACH, 3 1/4" HYDRA LIAK,										
2 1/4" DETACH										
ALL THREE LEGS EXTERIOR RIGID										
3' FARM GROUND RING										

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

## INSPECTION RESULTS

### OSCAR FOUR

#### Buoy

This is a 10-foot-diameter peg-top buoy with a 4-foot freeboard. The buoy's edges have moderate to heavy rust, and 3 to 4 inches of marine growth on the bottom. The rubber fenders and chafing rail are in good condition. The top tension bar padeye and attached spider plate are worn to 71 and 58 percent, respectively, of their original wire diameters.

#### Riser Chain Subassembly

Double-link measurements taken near the middle of the riser chain were between 80 and 90 percent of original wire diameter. Otherwise, all readings were greater than 90 percent.

#### Anchor Chain Subassemblies

Approximately 15 feet of each of these subassemblies was visible before the chain entered the bottom. Measurements taken of the upper end of each chain were greater than 90 percent of original wire diameter.

#### Cathodic Protection

Two anodes, about 50-75 percent depleted, were located on the buoy bottom. Underwater voltmeter readings measured the cathodic protection to be between -1.01 volts at the buoy anode to -.69 volts on the riser chain near the ground ring.

#### Conclusions/Recommendations

Due to the badly worn condition of the top jewelry and upper padeye, this mooring is considered to be unsatisfactory for continued fleet use. This mooring should be removed from service and overhauled at the earliest practical time.



MOORING NO.: OSCAR 4 CLASS: E LOCATION: NUL'S SEAL BEACH LAT: 33°43'54.44" N LONG: 118°05'32.54" W  
 BUOY TYPE: SEC TLP (10' depth) ANCHOR SIZE/TYPE: AL WATER DEPTH: 40' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND  
 DATE: 1 ALC 1984 ENGINEER IN CHARGE: J.A. THORNTON DIVERS: MAHIN/PHELPS (0750-0544 HRS)

COMPONENTS	GAUGE SIZE	CONDITION						COMMENTS	
		LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH		
			90+	80+	80--	90+			80+
BUOY HARDWARE									BUOY (5' DIA) HAS 4' FREEBOARD AND SLIGHT LIST, MODERATE TO HEAVY RUST ON EDGES, PADEYE WORK TO 1 1/2" SPIDER TO 1 3/4", RUBBER FEEDER AND CHAFING RAIL GOOD CONDITION. MARINE GROWTH 3-4" ON FITTING, TACKLING ALGAE (3 1/2" X 3") 50-75% EXPENDED, MODERATION TOP. ACCESSORIES BETWEEN RISER CHAIN AND GROUND RING - 2 1/2" DETACH, 2 3/4" BLINK, 2 3/4" O LINK, 3 1/4" N' ACC DETACH.
RISER									
GROUND RING									
BRAG GROUND LEG NO. A									
BRAG GROUND LEG NO. B									
BRAG GROUND LEG NO. C									
BRAG GROUND LEG NO. D									
BRAG GROUND LEG NO. E									
BRAG GROUND LEG NO. F									
BRAG GROUND LEG NO. G									
BRAG GROUND LEG NO. H									
BRAG GROUND LEG NO. I									
BRAG GROUND LEG NO. J									
BRAG GROUND LEG NO. K									
BRAG GROUND LEG NO. L									
BRAG GROUND LEG NO. M									
BRAG GROUND LEG NO. N									
BRAG GROUND LEG NO. O									
BRAG GROUND LEG NO. P									
BRAG GROUND LEG NO. Q									
BRAG GROUND LEG NO. R									
BRAG GROUND LEG NO. S									
BRAG GROUND LEG NO. T									
BRAG GROUND LEG NO. U									
BRAG GROUND LEG NO. V									
BRAG GROUND LEG NO. W									
BRAG GROUND LEG NO. X									
BRAG GROUND LEG NO. Y									
BRAG GROUND LEG NO. Z									

## INSPECTION RESULTS

### OSCAR FIVE

#### Buoy

This is a 10-foot-diameter peg-top buoy which is listing badly (40-50 degrees). About 20 percent of the wooden chafing strip is badly deteriorated and the two wooden fenders are in poor condition. The sides of the buoy are covered with moderate to heavy rust and the top jewelry is covered with heavy rust. The buoy bottom has 4 inches of marine growth.

#### Riser Chain Subassembly

One double-link measurement of the riser chain near the ground ring was between 80 and 90 percent of the original wire diameter. A wire rope is entwined with the riser chain. The ground ring was located at a depth of 30 feet.

#### Anchor Chain Subassemblies

All three subassemblies are buried and could not be inspected.

#### Cathodic Protection

Underwater voltmeter readings measured the cathodic protection to be between -.69 volts on the buoy to -.63 volts on the upper link of one of the anchor chain subassemblies.

#### Conclusions/Recommendations

This mooring appears to be in fair condition, but its use should be restricted until the buoy's list is investigated and the cause of this list corrected. In addition, the buoy needs to be overhauled and its fenders and chafing strip replaced.

MOORING NO: CHSAR 5 CLASS: E LOCATION: NORSE SEAL BEACH LAT: 35° 43' 45" N LONG: 115° 25' 31" W  
 BUOY TYPE: PEC T6 (10' DIA) ANCHOR SIZE/TYPE: A 1" WATER DEPTH: 30' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND  
 DATE: 31 JULY 84 ENGINEER IN CHARGE: J. A. THORNTON DIVERS: HARDING/HARRIS (1208 - 1248 HRS)

COMPONENTS		GAUGE SIZE	CONDITION						COMMENTS
			LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH	
90+	80+	80-		90+	80+	80-			
BUOY HARDWARE	TOP-3 1/2" PAD EYE, 3"								BUOY LISTING BADLY (40-50%), ONLY 50% OFFENDED CHAFFING RAIL IN SAT CONDITION, 50% TOP RIGID FEEDER IN FINE CONDITION, 50% OF LOWER FEEDER DETERIORATED, MODERATE TO HEAVY RUST ON SIDES. A WIRE ROPE IS ENTWINED WITH RISER CHAIN AND ONE LEG, HEAVY RUST ON TOP JEWELRY, ONLY RUSTY HAS 4" OF MARINE GROWTH. ACCESSORIES BETWEEN RISER AND GROUND RING - 3" DETACH, 2 1/2" B LINK, 2 1/2" C LINK, 4" HALL DETACH.  GROUND RING TO EACH LEG - 3 1/2," WIRE DETACH, 3" PEAK, 2 1/2" DETACH  WIRE CHAIN SUBASSEMBLIES BEHIND BELOW C.R. ACCESSORIES
	SPIDER, 2 3/4" SINKER (4)								
	2 1/2" PEAK (4)								
	DETACH-2 1/2" SHAKLE, 2" B								
BUOY	LINK, 2 1/2" DETACH								
	NEAR BUOY	2 1/2" 15"	✓✓✓		✓✓✓		-66	9'	
	MIDDLE	↓ ↓	✓✓✓		✓✓✓		-64		
	NEAR GRD RG	↓ ↓	✓✓✓		✓✓✓			26'	
GROUND RING		4 1/2" x 19" INSIDE DIAMETER						30'	
BRAC- GROUND LEG NO. A C.C.C.	UPPER END						-64		
	MIDDLE	BURIED							
	ENTERS BOTTOM								
BRAC- GROUND LEG NO. B 270°	UPPER END						-64		
	MIDDLE	BURIED							
	ENTERS BOTTOM								
BRAC- GROUND LEG NO. C 350°	UPPER END						-63		
	MIDDLE	BURIED							
	ENTERS BOTTOM								

## INSPECTION RESULTS

### OSCAR SIX

#### Buoy

This is a 10-foot-diameter peg-top buoy with a 3-foot freeboard. Its rubber fenders and chafing strip are in good condition. The buoy's sides are covered with a light rust, and its upper padeye and fender clips are moderately rusted. The bottom of the buoy has about 4 inches of marine growth.

#### Riser Chain Subassembly

The riser chain was measured to be greater than 90 percent of its original 2 1/2-inch wire diameter. The ground ring was located at a depth of 38 feet.

#### Anchor Chain Subassemblies

About 5 feet of each subassembly was visible. Except for subassembly B, which measured between 80 and 90 percent, all measurements were greater than 90 percent.

#### Cathodic Protection

Two anodes, about 20 percent depleted, were observed on the bottom of the buoy. Underwater voltmeter readings measured the cathodic protection to be between -.96 volts at the anode and -.64 volts on the upper links of anchor chain subassembly A.

#### Conclusions/Recommendations

This mooring is in satisfactory condition for continued use in its current capacity as a Class F mooring.

MOORING NO.: OSCAR 6 CLASS: E LOCATION: NL'S SEAL BEACH LAT: 33° 43' 33" N LONG: 118° 05' 51" W  
 BUOY TYPE: RED TOP (10' DIA) ANCHOR SIZE/TYPE: NI WATER DEPTH: 45' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND  
 DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: SAKO/CICCONE (1618-1648 HRS)

COMPONENTS	GAUGE SIZE	CONDITION						COMMENTS
		LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH	
			90+	80+	80-	90+		
TOP - 3" PADEYE								BUOY HAS 3' FREEBOARD, 20' DEEPER
3" SPIDER							SP-5 VELT	FENDERS/CHAFING RAIL IN GOOD
BOTTOM-3 1/4" DETACH							(ANODE) -96	CONDITION. LIGHT RUST INSIDES;
2 1/3" SHACKLE							(ANODE) -84	MODERATE RUST AT PADEYE AND CO.
							-85	UPPER FENDER CHIPS, BOTTOM HAS 4"
								OF MARINE GROWTH, BOTTOM EXTEND
NEAR BUOY	2 1/2"	15"	✓✓✓			✓✓✓	-82	SHINY AND CLEAR, TWO ANODES
MIDDLE		↓	✓✓✓			✓✓✓	-83	36" x 4" COPPERY BOTTOM (20% EXTENDED)
NEAR GRD RG	↓	↓	✓✓✓			✓✓✓	-82	ADDERIES BETWEEN RISER CHAIN
GROUND RING	5 1/4" x 15" INSIDE DIAMETER							AND GROUND RING - 2 1/2" DETACH,
UPPER END	2 1/2"		✓✓✓			✓✓✓		2 3/8" C LUG, 4" ANODE DETACH,
MIDDLE								
ENTERS BOTTOM			✓✓✓			✓✓✓	45'	GROUND RING TO EACH HATCHER CHAIN
UPPER END			✓✓✓			✓✓✓	40'	SUBASSSEMBLY - 4" ANODE DETACH,
MIDDLE								2 1/4" PEAR, 2 3/4" DETACH,
ENTERS BOTTOM			✓✓✓			✓✓✓	45'	ABOUT 5' OF EACH ANCHOR CHAIN
UPPER END			✓✓✓			✓✓✓	40'	SUB ASSEMBLY VISIBLE,
MIDDLE			✓✓✓			✓✓✓		
ENTERS BOTTOM		✓	✓✓✓			✓✓✓	45'	

SHEET 1 OF 1

## INSPECTION RESULTS

### OSCAR SEVEN

#### Buoy

This is a 10-foot-diameter peg-top buoy. The buoy is listing badly (about 45 degrees). Its rubber fenders and chafing strip are in good condition. The side of the buoy with the least freeboard is covered with a light coating of rust.

#### Riser Chain Subassembly

Single- and double-link measurements of the riser chain were all greater than 90 percent of its original 2 1/2-inch wire diameter. The ground ring is buried.

#### Anchor Chain Subassemblies

The three subassemblies are buried and could not be inspected.

#### Cathodic Protection

Two anodes, about 20 percent depleted, were observed on the buoy bottom. Underwater voltmeter readings measured the cathodic protection to be between -.97 volts at an anode to -.74 volts at the lower section of the riser chain.

#### Conclusions/Recommendations

The mooring chain is in good condition, but the mooring's use should be restricted until the buoy's list is investigated and the cause of the list corrected.

MOORING NO.: C-5-CAR 7 CLASS: E LOCATION: N. O'S SEAL BEACH LAT: 33° 43' 49.8" N LONG: 118° 05' 55.2" W  
 BUOY TYPE: RED TOP (16" DIA) ANCHOR SIZE/TYPE: N/A WATER DEPTH: 45' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND  
 DATE: 30 JULY 84 ENGINEER-IN-CHARGE: J. A. THORNTON DIVERS: CICONE/GRIFFIN (17:5-17:55 HRS)

COMPONENTS		GAUGE SIZE	CONDITION							COMMENTS		
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %				DEPTH	
90+	80+	80-		90+	80+	80-	90+	80+	80-			
BUOY HARDWARE	TOP - 4" PADDY										BUOY HAVING ABOUT 45° RUBBER	
	3 1/2" SPIDER 3 1/2" NO. 1										FENDERS/CHAFING BARS IN	
	(2) 2 3/4" PEARL (4)										GOOD CONDITION, LIGHT RUST	
	BUTTER - 3 1/4" WARE DETAIL										ON SIDES, LIGHT GRAIN COVERS ON	
RISER	2 1/2" PEARL 2 3/4" DETAIL										OVER TOP DECK. TWO ADDRESSES ON	
	NEAR BUOY	2 1/2"	✓✓✓				✓✓✓			8'	BUOY 36" x 3 1/2" x 3 1/2" ABOUT	
	MIDDLE	↓	✓✓✓				✓✓✓			30'	20% EXPENDED	
	NEAR GRD RG	↓	✓✓✓				✓✓✓			45'		
GROUND RING			BURIED									ALL THREE ANCHOR CHAINS
GROUND LEG NO. A	UPPER END											SUBASSEMBLIES AND GROUND
	MIDDLE		BURIED									LINE BURIED.
	ENTERS BOTTOM											
GROUND LEG NO. B	UPPER END											
	MIDDLE		BURIED									
	ENTERS BOTTOM											
GROUND LEG NO. C	UPPER END											
	MIDDLE		BURIED									
	ENTERS BOTTOM											

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

## INSPECTION RESULTS

### OSCAR EIGHT

#### Buoy

This is a 10-foot-diameter peg-top buoy. It has light rust and pitting on its sides and moderate rust on the top hardware. The rubber fenders and chafing strip are in good condition. The bottom is covered with 4 to 5 inches of marine growth.

#### Riser Chain Subassembly

All single- and double-link measurements were greater than 90 percent of riser chain's original 2 1/2-inch wire diameter. The ground ring and lower portion of the riser are buried.

#### Anchor Chain Subassembly

These subassemblies are buried in the bottom.

#### Cathodic Protection

Two anodes, about 20 percent depleted, were observed on the buoy's bottom. Underwater voltmeter measured the cathodic protection to be between -.97 volts at an anode and -.79 volts on the riser near the mud line.

#### Conclusions/Recommendations

This mooring is in satisfactory condition for continued use in its current capacity as a Class E mooring. However, the buoy should be refurbished.



MOORING NO: CISCAR E CLASS: E LOCATION: NILES SEAL BEACH LAT: 33°43'45"N LONG: 118°25'55"W  
 BUOY TYPE: See Top (No. 1) ANCHOR SIZE/TYPE: N/I WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND  
 DATE: 30 JULY 84 ENGINEER-IN-CHARGE: J. A. THORNTON DIVERS: CICCARIE/GRIFFIN (1615-1650 HRS)

COMPONENTS	GAUGE SIZE	CONDITION					COMMENTS
		LINK LENGTH	SINGLE LINK %			DOUBLE LINK %	DEPTH
TOP 3" PADEYE 3" SPIDER BOTTOM 2 1/2" DETACH			90+	80+	80-	80+	
BUOY HARDWARE							
NEAR BUOY MIDDLE NEAR GRD RG	2 1/2"	15"	✓✓			✓✓	
			✓✓			✓✓	
			✓✓			✓✓	
GROUND RING							
GROUND LEG NO. A							
GROUND LEG NO. B							
GROUND LEG NO. C							

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

## INSPECTION RESULTS

### ECHO ONE

#### Buoy

This is a 10-foot-diameter peg-top buoy with a 40-inch freeboard. Although its upper wood fender and chafing strip are in good condition, the lower fender is badly deteriorated. There is heavy rust on the sides of the buoy and on the top fender and chafing strip clips.

#### Riser Chain Subassembly

Single- and double-link measurements of the riser chain were all greater than 90 percent of its original 2 3/4-inch wire diameter. The ground ring was located at a depth of 40 feet.

#### Anchor Chain Subassembly

Only the top few links of each subassembly were visible before the chain enters the bottom. These links were also measured to be greater than 90 percent.

#### Cathodic Protection

Two anodes, each with about 40 percent of their zinc expended, were observed on the buoy. Underwater voltmeter readings measured the cathodic protection to be between -.96 volts at an anode and -.82 volts on the upper links of the anchor chain subassemblies.

#### Conclusions/Recommendations

This mooring is in satisfactory condition for continued use in its current capacity as a Class F mooring. However, the buoy should be refurbished.

MOORING NO: ECHC 1 CLASS: F LOCATION: NAL'S SEAL BEACH LAT: 33°44'27"N LONG: 118°25'30"W  
 BUOY TYPE: SEC TOP (10' DIAM) ANCHOR SIZE/TYPE: N/I WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND  
 DATE: 1 AUG 84 ENGINEER IN CHARGE: J.A. THORNTON DIVERS: SAKO/CICCOLE (1450 - 1525 HRS)  
GRIFFIN/HARDING (1330 - 1415 HRS)

COMPONENTS	GAUGE SIZE	CONDITION						COMMENTS	
		LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH		
			90+	80+	80-	90+			80+
BUOY HARDWARE									
TOP 3" EYE 3/4"									BUOY (SN 22) HAS 3/4" FREEBOARD.
SPIDER 2 3/4" STRIKE (6)									LOWER KNEED FENDER BARRY
3 1/2" PEAR (4)									PETERIGATED, LOWER KNEED
BOTTOM - 3 1/4" DETACH.									FENDER AND CHAFING STRIP ARE IN
3 1/8" PEAR 2 3/8" DETACH									GOOD CONDITION, HEAVY RUST ON
RISE	NEAR BUOY	2 1/4"	✓✓✓			✓✓✓			10'
	MIDDLE	2 1/4"	✓✓✓			✓✓✓			13'
	NEAR GRD RG	2 1/4"	✓✓✓			✓✓✓			35'
GROUND RING		4 1/4" x 16 1/2" INSIDE DIAMETER							40'
	UPPER END	2 1/4"	✓✓✓			✓✓✓			40'
	MIDDLE								
GROUND LEG NO. A / 11C	ENTERS BOTTOM								
	UPPER END	2 1/2"	✓✓✓			✓✓✓			
	MIDDLE								
GROUND LEG NO. B / 24C	ENTERS BOTTOM								
	UPPER END	2 1/2"	✓✓✓			✓✓✓			
	MIDDLE								
GROUND LEG NO. C / 34C	ENTERS BOTTOM								
	UPPER END	2 1/2"	✓✓✓			✓✓✓			
	MIDDLE								

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

## INSPECTION RESULTS

### ECHO TWO

#### Buoy

This is a 10-foot-diameter peg-top buoy with a 3-foot freeboard. Its rubber fenders and chafing strip are in good condition. It has light rust on its sides and moderate rust on the buoy edges and top jewelry.

#### Riser Chain Subassembly

Some measurements near the middle and lower end of the riser chain were between 80 and 90 percent of its original 2 1/2-inch wire diameter. The ground ring was located at a depth of 40 feet.

#### Anchor Chain Subassemblies

Only the top few links of each anchor chain were visible before it entered the bottom. Although subassembly B measured greater than 90 percent of the original 2 1/2-inch wire diameter, the other two subassemblies measured between 80 and 90 percent.

#### Cathodic Protection

Only one anode, with about 40 percent of its zinc expended, was observed on the buoy. Underwater voltmeter readings measured the cathodic protection between -.96 volts near the anode and -.71 volts at the upper links of the anchor chain assemblies.

#### Conclusions/Recommendations

Although measurements of the anchor chain subassemblies taken during this inspection were between 80 and 90 percent, measurements taken during the 1982 inspection had subassembly measurements of less than 80 percent. Based on this data, the condition of the mooring is poor. However, due to its oversized chain, this mooring is in satisfactory condition for continued use in its current capacity as a Class F mooring.

MOORING NO.: ECHC 2 CLASS: F LOCATION: NOUS SEAL BEACH LAT: 33°44'00"N LONG: 118°05'49.1"W  
 BUOY TYPE: PEG TOP (6" DIA) ANCHOR SIZE/TYPE: NI WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND  
 DATE: 1 APR 54 ENGINEER-IN-CHARGE: J.A. THURTELL DIVERS: SAKO/GRIFFIN (1111-1310 HRS)  
SAKO/CICCOONE (0534-1610 HRS)

COMPONENTS	GAUGE SIZE	CONDITION							COMMENTS
		LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH		
			90+	80+	80-	90+		80+	
BUOY HARDWARE	TOP-3 1/2" PAD EYE, 3 3/4"								BUOY (SN 138) HAS 3 FREEBOARD.
	SNIDER, 2 1/2" x 3"							CPS VENTS	RUBBER FEEDERS AND CHAFING
	SNIDER, 2" PEAR(3)							(BUOY) -96	STRIP IN GOOD CONDITION, LIGHT
	BOTCH-3" PAD EYE,								RUST ON SIDES, MODERATE RUST
	2 3/8" SHACKLE								ON BUOY EDGES AND TOP JERSEY
RISER	NEAR BUOY	2 1/2"	✓✓✓			✓✓✓			ONE ANGLE 36" x 3" x 3" CORRODED
	MIDDLE	↓	✓✓✓			✓✓✓			ABOUT 40% ENDED.
	NEAR GRD RG	↓	✓✓✓			✓✓✓			
GROUND RING		4 1/4" x 19"	INSIDE DIAMETER						ACCESSORIES BETWEEN RISER CHAIN
	UPPER END	2 1/2"	✓✓✓			✓✓✓			AND GROUND RING - 3" DETACH,
	MIDDLE								3" B LINK, 3" C LINK, 4" A AND
VERTICALLY GROUND LEG NO. A 14C	ENTERS BOTTOM								DETACH.
	UPPER END	2 3/4"	✓✓✓			✓✓✓			
	MIDDLE								
VERTICALLY GROUND LEG NO. B 14C	ENTERS BOTTOM								
	UPPER END	2 1/4"	✓✓✓			✓✓✓			ON TOP FEED LINKS OF
	MIDDLE								EACH ANCHER CHAIN
VERTICALLY GROUND LEG NO. C 14C	ENTERS BOTTOM								SUBASSEMBLY VISIBLE,

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 2

MOORING NO: ECHE 2 CLASS: F LOCATION: AL'S SEAL BEACH LAT: 33° 44' 06.7" N LONG: 115° 05' 45.1" W

BUOY TYPE: SEC T-10 (6' DIAM) ANCHOR SIZE/TYPE: 1" I WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: 1 AUG 84 ENGINEER IN CHARGE: J.A. THORNTON DIVERS: HARDING GRIFFIN

COMPONENTS		GAUGE SIZE	CONDITION						COMMENTS
			LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH	
BUOY HARDWARE			90+	80+	80 -	90+	80+	80 -	
								2PS	
								WLT2	
HISER	NEAR BUOY								
	MIDDLE								
	NEAR GRD RG								
GROUND RING									
VERTICALLY GROUND LEG NO. D 1212 8.1.7.4	UPPER END	2 1/4"	13 1/2"	✓✓			✓✓	69	42'
	MIDDLE								
	ENTERS BOTTOM								
GROUND LEG NO.	UPPER END								
	MIDDLE								
	ENTERS BOTTOM								
GROUND LEG NO.	UPPER END								
	MIDDLE								
	ENTERS BOTTOM								
GROUND LEG NO.	UPPER END								
	MIDDLE								
	ENTERS BOTTOM								

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 2 OF 2

## INSPECTION RESULTS

### ECHO THREE

#### Buoy

This is a 10-foot-diameter peg-top buoy. Its two rubber fenders and chafing strip are in good condition. There is some light rust on the fender clips. This buoy is in good condition.

#### Riser Chain Subassembly

All single- and double-link measurements were greater than 90 percent of its original 2 3/4-inch wire diameter. The ground ring was located at a depth of 39 feet.

#### Anchor Chain Subassemblies

All subassemblies are buried in the bottom and inaccessible for inspection.

#### Cathodic Protection

Two zinc anodes, about 50-75 percent depleted, were observed on the buoy. Underwater voltmeter readings measured the cathodic protection to be between -.98 volts at an anode and -.83 volts on the riser chain subassembly near the mud line.

#### Conclusions/Recommendations

This mooring is in satisfactory condition for continued use in its current capacity as a Class F mooring.

MOORING NO.: ETCHO 3 CLASS: F LOCATION: NILES SEAL BEACH LAT: 33°44' 05.72" N LONG: 118°25' 45.2" W  
 BUOY TYPE: REG TOP (10' DIAM) ANCHOR SIZE/TYPE: 11" I WATER DEPTH: 40' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND  
 DATE: 1 JUL 68 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: PHILIPS/MANN (0712 - 1002 HRS)

COMPONENTS		GAUGE SIZE	CONDITION						COMMENTS
			LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH	
				90+	80+	80 -	90+		
BUOY HARDWARE	TOP - 3 1/2" PANEYE								BUOY (SINK) HAS TWO RUBBER FENDERS AND ONE CHAFIN RAIL IN GOOD CONDITION. LIGHT ANCH NOTED ON FENDER CLIPS. TWO ZINC ANODES (34" x 3" x 3") ON BUEY. ABOUT 60-75% DEPLETED.
	3/4" SPIDER							SP'S VETS	
	BUTTER - 3 1/2" PANEYE							(ANODE) - 98	
	3 3/4" 2 LINKS							(BUOY) - 90	
RISER	2 1/2" SHAKLE								
	NEAR BUOY	2 3/4" 16 3/4"	✓✓✓			✓✓✓			9'
	MIDDLE	↓	✓✓✓			✓✓✓		-87	21'
	NEAR GRD RG	↓	✓✓✓			✓✓✓		-83	30'
	GROUND RING	5" x 19" INSIDE DIAMETER							39'
	UPPER END								
ANCHOR GROUND LEG NO. A 290	MIDDLE	BUCKLED							
	ENTERS BOTTOM								
	UPPER END								
ANCHOR GROUND LEG NO. B 120	MIDDLE	BUCKLED							
	ENTERS BOTTOM								
	UPPER END								
ANCHOR GROUND LEG NO. C 270	MIDDLE	BUCKLED							
	ENTERS BOTTOM								

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1



## INSPECTION RESULTS

### ALPHA ONE

#### Buoy

This is a 12-foot-diameter drum-type buoy. The buoy has a combination wood fender/chafing strip (60 percent deteriorated) covering the junction of the top deck and side. In addition it has two rubber fenders and two rubber chafing strips. About 20 percent of the top fender is missing. The buoy is fiberglass coated with some of the fiberglass worn off at the buoy edges. There is light rust bleeding on the top and sides. The top jewelry has heavy rust and pitting.

#### Riser Chain Subassembly

All single- and double-link chain measurements were between 80 and 90 percent of its original 2 3/4-inch wire diameter. The ground ring was located at a depth of 33 feet.

#### Anchor Chain Subassemblies

About 15-20 feet of each subassembly was visible before the chain entered the bottom. The upper and middle sections of the visible chain were measured to be between 80 and 90 percent of original 2 1/2-inch wire diameter.

#### Cathodic Protection

No cathodic protection system has been applied to this mooring.

#### Conclusions/Recommendations

The buoy needs to be refurbished. Otherwise, this mooring is in satisfactory condition for continued use in its current capacity as a Class E mooring.

MOORING NO: ALPHA 1 CLASS: E LOCATION: N. 10° S. SEAL BEACH LAT: 33° 44' 01.8" N LONG: 115° 25' 22.4" W  
 BUOY TYPE: DECK (12' DIA) ANCHOR SIZE/TYPE: N I WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND  
 DATE: 30 JULY 84 ENGINEER IN CHARGE: J. A. THORNTON DIVERS: SAKO/PHILIPS (1334 - 1416 HRS)

COMPONENTS		GAUGE SIZE	CONDITION						COMMENTS
			LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH	
90+	80+	80-		90+	80+	80-			
BUOY HARDWARE	TOP 3 1/4" SPIDER (2)								TOP JEWELRY HAVE HEAVY FITTING
	2 1/2" PEAR (4)								AND CORROSION. FIBERGLASS
	BOTTOM 3" END LINK (3)								COATING WORN OFF AT BUOY
	3 1/4" DETACH								EDGES. THE BUOY HAS CORROSION
RISER	NEAR BUOY	2 3/4"	16 1/2"	✓✓	✓✓	✓✓	✓✓	8'	WOODEN FENDER/CHAFING STRIP
	MIDDLE	↓	↓	✓✓	✓✓	✓✓	✓✓	25'	(60% DETERIORATED) AROUND THE
	NEAR GRD RG	↓	↓	✓✓	✓✓	✓✓	✓✓	32'	JUNCTION OF TOP DECK AND SIDE.
GROUND RING	UPPER END	5 1/4"	15 1/2"	✓✓	✓✓	✓✓	✓✓	33'	IN ADDITION, THE BUOY HAS TWO
	MIDDLE	2 1/2"	15"	✓✓	✓✓	✓✓	✓✓		RUBBER FENDERS AND TWO CHAIN
	ENTERS BOTTOM	↓	↓	✓✓	✓✓	✓✓	✓✓	42'	STRIPS. ABOUT 30% OF THE TOP
BRACED GROUND LEG NO. A 120°	UPPER END			✓✓	✓✓	✓✓	✓✓		FENDER IS MISSING. THERE IS
	MIDDLE			✓✓	✓✓	✓✓	✓✓		LIGHT RUST BLEEDING ON THE
	ENTERS BOTTOM			✓✓	✓✓	✓✓	✓✓		TOP AND SIDES.
BRACED GROUND LEG NO. B 120°	UPPER END			✓✓	✓✓	✓✓	✓✓		GROUND RING TO EACH ANCHOR
	MIDDLE			✓✓	✓✓	✓✓	✓✓		CHAIN SUBASSEMBLY - 4" WASH
	ENTERS BOTTOM			✓✓	✓✓	✓✓	✓✓	42'	DETACH, 2 1/2" PEAR, 3" DETACH.
BRACED GROUND LEG NO. C 120°	UPPER END			✓✓	✓✓	✓✓	✓✓		ABOUT 15-20% OF EACH ANCHOR
	MIDDLE			✓✓	✓✓	✓✓	✓✓		CHAIN SUBASSEMBLY VISIBLE.
	ENTERS BOTTOM			✓✓	✓✓	✓✓	✓✓	42'	

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

## INSPECTION RESULTS

### ALPHA TWO

#### Buoy

This is a 12-foot-diameter drum-type buoy with a 5-foot freeboard. A combination wood fender/chafing strip covers the junction of the top deck and sides. This timber has grooves worn in it from the movement of wire ropes. There is no other fender on the buoy. The top tension bar padeye is severely corroded and worn. Buoy bottom has about 5 inches of marine growth.

#### Riser Chain Subassembly

The upper end of this chain is worn to between 80 and 90 percent of its original 2 1/2-inch wire diameter. The ground ring was located at a depth of 32 feet.

#### Anchor Chain Subassemblies

About 7 feet of subassembly A and 25 feet of subassemblies B and C were visible before the chains entered the bottom. The upper end of subassembly A was measured to be less than 80 percent of its original 2 1/2-inch wire diameter, while the other two legs are between 80 and 90 percent.

#### Cathodic Protection

Two anodes, about 50 percent depleted, were located on the buoy bottom. Underwater voltmeter readings measured the cathodic protection to be between -.85 volts at the top of the riser chain and -.77 volts at the upper end of the anchor chain subassemblies.

#### Conclusions/Recommendations

Because anchor chain assembly A measures less than 80 percent of original wire diameter, this mooring is in poor condition. Normally, a measurement this low of any component is cause for the mooring to be removed from service until

the unsatisfactory component is replaced. However, since the reduced wire diameter of subassembly A is still larger than that required for a Class F mooring (1 1/4 inches), this mooring is satisfactory for fleet use as long as it is not subjected to loads in excess of Class F load limits as defined in NAVFACENGCOM Design Manual DM-26.

MOORING NO: ALPHA 2 CLASS: E LOCATION: ALCO'S SEAL BEACH LAT: 33°44' 41" N LONG: 115°25'25" W  
 BUOY TYPE: DECK (12' DIA) ANCHOR SIZE/TYPE: NI WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND  
 DATE: 30 JULY 84 ENGINEER IN CHARGE: J. A. THORNTON DIVERS: SAKA/PHELPS (1441-1528 HRS)

COMPONENTS	GAUGE SIZE	CONDITION						COMMENTS	
		LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH		
			90+	80+	80 -	90+			80+
BUOY HARDWARE	TOP- 2 3/4" SPIDER							CP3 WWS	BUOY (S/L 100) HAS A TENSION BAR
	2 1/2" PEAR (2)								AND A 5' FREEBOARD. ONE WIRE DEN
	BOTTOM- 3 1/4" END LINK								FENDER/CHAFING STRIP CORNERS
	2 3/4" END LINK								JUNCTION OF THE TOP DECK AND
	2 3/4" DETACH								SIDE. THIS STRIP HAS GROOVES
RISER	NEAR BUOY	2 1/2" 15"	✓✓✓			✓✓✓	8'	-85	WORN IN IT FROM WIRE ROPES.
	MIDDLE	↓	✓✓✓		✓✓✓			-80	THERE IS SEVERE CORROSION OF
	NEAR GRD RG	↓	✓✓✓		✓✓✓		30'	-81	THE TOP FRAME. TWO HANDLES
GROUND RING		5 1/2" x 15"					32'		(36" x 4" x 3") ON BUOY DETACH
	UPPER END	2 1/2" 15"			✓✓✓			-77	AS WELL AS 5" OF MARINE
	MIDDLE		✓✓✓			✓✓✓	7' TO DETACH		GROWTH.
GROUND LEG NO. A	ENTERS BOTTOM		✓✓✓		✓✓✓		42'		ACCESSORIES BETWEEN RISER
	UPPER END		✓✓✓			✓✓✓		-77	CHAIN AND GROUND RING - 3 3/8"
	MIDDLE						25' TO DETACH		DETACH, 3" END LINK, 3 1/4" CLINK,
GROUND LEG NO B	ENTERS BOTTOM		✓✓✓				42'		A" WACO DETACH. GROUND RING
	UPPER END		✓✓✓			✓✓✓		-78	TO EACH LEG - 3 3/4" WACO DETACH
	MIDDLE						25' TO DETACH		2 1/4" PEAR, 2 3/4" DETACH. TWO
GROUND LEG NO C	ENTERS BOTTOM	↓	✓✓✓		✓✓✓		42'		LEGS ARE CROSSED

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

## INSPECTION RESULTS

### ALPHA THREE

#### Buoy

This is a 12-foot-diameter drum-type buoy with a 46-inch freeboard. Its rubber fenders and chafing strip are in good condition. There is moderate rust on the top deck where the paint is worn off and some light rust on the fender clips and manhole covers.

#### Riser Chain Subassembly

Single- and double-link measurements of the riser chain were all greater than 90 percent of its original 2 1/2-inch wire diameter. The ground ring is lying on the bottom at a depth of 30 feet.

#### Anchor Chain Subassemblies

The three subassemblies are buried in the bottom and inaccessible for inspection.

#### Cathodic Protection

Two anodes, about 50 percent depleted, were observed on the buoy bottom. Underwater voltmeter readings measured the cathodic protection to be between -.86 volts near the middle of the riser and -.74 volts at the ground ring.

#### Conclusions/Recommendations

This mooring is in satisfactory condition for continued use in its current capacity as a Class E mooring. However, the buoy should be refurbished.

MOORING NO: ALPHA 3 CLASS: E LOCATION: N 1/2, SEAL BEACH LAT: 33° 43' 59" N LONG: 115° 05' 21" W  
 BUOY TYPE: DRUM (12' DIAM) ANCHOR SIZE/TY: N 1" I WATER DEPTH: 30' VISIBILITY: 2' BOTTOM TYPE: SILT/SAND  
 DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: HARDING/MANN (C945-1015 HRS)

COMPONENTS	GAUGE SIZE	CONDITION						COMMENTS	
		LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH		
			90+	80+	80-	90+			80+
BUOY HARDWARE	TCP- 3" SPIDER								BUOY (S/N 146) HAS 3" FLEETBOARD
	1 1/2" SHACKLE (2)							GPS VOLTS	RUBBER FENDERS/CHAFING
	BOTTOM-3" DETACH								STRIP IN GOOD CONDITION.
	2" PEAR							-85	RUST ON TOP DECK WHERE PAINT
	3" DETACH								IS WEAR OFF. LIGHT RUST ON
RISER	NEAR BUOY	2 1/2"	✓✓✓			✓✓✓			8' FENDER CLIPS AND MANHOLE
	MIDDLE	↓	✓✓✓			✓✓✓			18' COVERS, TWO ANODES (3" x 4" x 4")
	NEAR GRD RG	↓	✓✓✓			✓✓✓			27' ON BOTTOM - ABOUT 50% DELETED
GROUND RING		4 1/2" x 16" INSIDE DIAMETER						-74	G.R. LYING ON BOTTOM.
GROUND LEG NO. A	UPPER END								
	MIDDLE	BURIED							GROUND RING TO EACH ANCHOR
	ENTERS BOTTOM								CHAIN SUBASSEMBLY - 3" NACCI
GROUND LEG NO. B	UPPER END								DETACH, 2 1/4" PEAR, 2 1/2" DETACH.
	MIDDLE	BURIED							
	ENTERS BOTTOM								LEGS APPEAR TO BEAR TO THE
GROUND LEG NO. C	UPPER END								NORTH, ANCHOR CHAIN
	MIDDLE	BURIED							SUBASSEMBLIES NOT
	ENTERS BOTTOM								VISIBLE (BURIED IN POTRY)

FOR ADDITIONAL LEGS USE OTHER SHEETS

## INSPECTION RESULTS

### ALPHA FOUR

#### Buoy

This is a 12-foot-diameter drum-type buoy. Its two rubber fenders and chafing strip are in good condition. The top tension bar eye is worn to almost 80 percent of its original wire diameter. There is some light rust on the top deck and heavy rust spots on the sides.

#### Riser Chain Subassembly

Single- and double-link measurements were all greater than 90 percent of original 2 3/4-inch wire diameter. The ground ring was located near the bottom at a depth of 24 feet.

#### Anchor Chain Subassemblies

About 10 feet of subassemblies A and B was visible but subassembly C is buried. Measurements of the visible chain were greater than 90 percent of original 2 1/2-inch wire diameter.

#### Cathodic Protection

Two anodes, about 20 percent depleted, were located on the bottom of the buoy. Underwater voltmeter readings measured the cathodic protection to be between -.85 volts on the buoy and -.77 volts at the upper end of anchor chain subassembly A.

#### Conclusions/Recommendations

This mooring is in fair condition and satisfactory for continued use in its current capacity as a Class F mooring. However, the buoy tension bar should be replaced.



MOORING NO: ALPHA 4 CLASS: E LOCATION: AL'S SEAL BEACH LAT: 33° 44' 02" N LONG: 118° 05' 19.5" W  
 BUOY TYPE: DRUM (12' DIAM) ANCHOR SIZE/TYPE: AI WATER DEPTH: 25' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND  
 DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: HARDING/HARRIS (C901-C940 HRS)

COMPONENTS		GAUGE SIZE	CONDITION						COMMENTS	
			LINK LENGTH	SINGLE LINK %		DOUBLE LINK %		DEPTH		
90+	80+	80-		90+	80+	80-				
TOP - 3 1/4" RISER									BUOY HARDWARE	BUOY (S/N 140) HAS TWO RUBBER FELDERS AND A RUBBER CHAIN. STRIP TOP PAD EYE WENT TO 2 1/2" OF ORIGINAL DIAMETER. LIGHT RUST ON TOP DECK. HEAVY RUST SPOTS ON SIDES. THE ANCHES (36" x 4" x 4") ON BUOY BENTEN. ANCHES ABOUT 20% DEFLECTED. ACCESSORIES BETWEEN RISER CHAIN AND GROUND RING - 2 1/2" DETACH, 2 1/2" B LINK, 2 1/2" C LINK, 4" ANCH DETACH, LIGHT TO MODERATE RUST ON FELDER CLIPS, GROUND RING TO EACH ANCHOR CHAIN. SUBASSEMBLY - 4" ANCH DETACH, 2 1/2" FEAR, 2 1/2" DETACH. GROUND LEG C BURIED
2 1/4" FEAR (2)										
RISER	NEAR BUOY	3 3/4"	✓✓✓	✓✓✓					7'	
	MIDDLE		✓✓✓	✓✓✓					16'	
	NEAR GRD RG		✓✓✓	✓✓✓					20'	
GROUND RING		4"	X 19" WIDE		DIAMETER				24'	
GROUND LEG NO. A	UPPER END	2 1/2"	✓✓✓	✓✓✓					25'	
	MIDDLE								10' TO BOTTOM	
	ENTERS BOTTOM									
GROUND LEG NO. B	UPPER END	2 1/2"	✓✓✓	✓✓✓					25'	
	MIDDLE								10' TO BOTTOM	
	ENTERS BOTTOM									
GROUND LEG NO. C	UPPER END									
	MIDDLE									
	ENTERS BOTTOM									

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

ANNEX B

SURVEY OF SEAL BEACH

FLEET MOORINGS

## SEAL BEACH

### CONTROL POINT DESCRIPTION

(see figure B-1)

Station #1 - This station is located between Anaheim Bay and the protected anchorage on the spit of land to the northwest of the channel entrance into Anaheim Bay. The marker is a bronze metal disk in the concrete designated T1001.

Station #2 - This station is located between Anaheim Bay and the protected anchorage on the spit of land to the southeast of the channel entrance into Anaheim Bay. This marker is a temporary orange survey marker implanted but not placed in concrete. It is 500 feet southeast of Station #3 which is a permanent marker. The orange marker is on the protected anchorage side of the spit.

Station #3 - This station is on the southeast spit of land from the channel entrance into Anaheim Bay. The marker is at the end of the spit near the channel entrance and more to the bay side. It is a permanent marker placed in concrete and designated 196.

Station #4 - The station is a temporary marker made by the survey team. It is located on the northwesterly most pier in Anaheim Bay at the Weapons Station. The chiseled "X" is on the left of the pier when facing the bay and marked UCT-2 STATION #4 in orange paint. The pier is southeast of the boat ramp.

Station #6 - The station is a permanent marker on the southeast side of the bay. The marker is designated U1001 and is on the southeast corner of the ship unloading pier close to the water.

The listed stations do not have horizontal control. It was necessary to use the Seal Beach North Water Tank located in the administrative area of the depot,

designated Building 207, and the Seal Beach Navy Radar Tower located near the demolished bridge on old Anaheim Bay Road, designated Building 360, as horizontal control points.

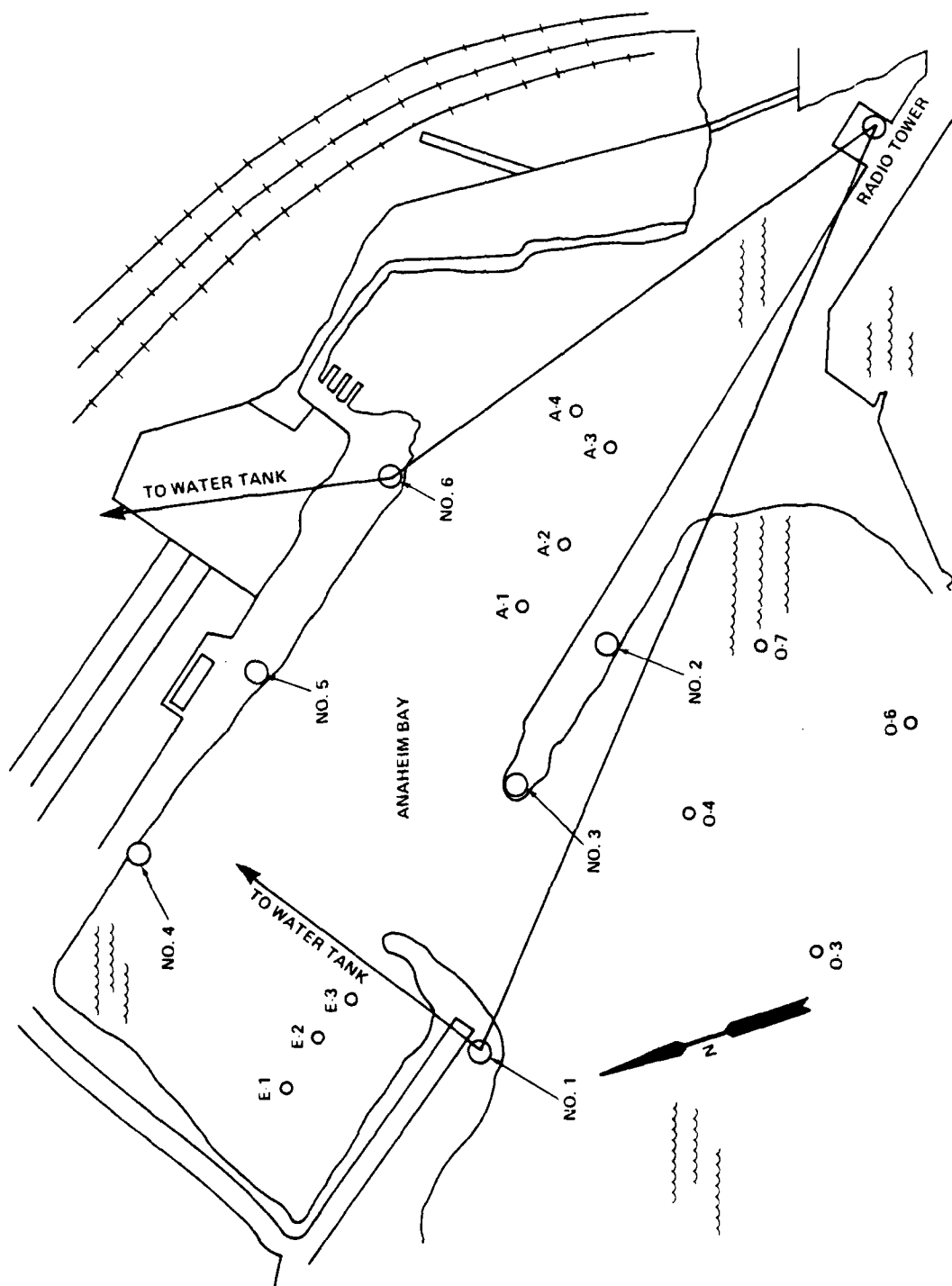


FIGURE B-1. SEAL BEACH CONTROL POINT LOCATIONS

# SEAL BEACH SURVEY DATA

Control Points	Designation
Station 1	T1001
Station 2	Orange Marker
Station 3	196
Station 4	UCT-2 marker on pier chisel X
Station 6	U1001

BL = Station 1 to Station 2

Buoy	Angle from BL		LATITUDE	LONGITUDE
	#1	#2		
Oscar 1	85.12°	297.36°	33°43'41.9"N	118°05'50.2"W
Oscar 3	66.67°	303.82°	33°43'50.1"N	118°05'42.6"W
Oscar 5	60.07°	285.30°	33°43'45.5"N	118°05'39.7"W
Oscar 6	106.67°	325.68°	33°43'53.6"N	118°05'51.9"W
Oscar 7	106.67°	318.62°	33°43'49.8"N	118°05'55.2"W
Oscar 8	106.88°	313.53°	33°43'45.9"N	118°05'58.7"W
Alpha 1	345.97°	90.12°	33°44'01.8"N	118°05'27.4"W
Alpha 2	348.05°	118.83°	33°44'01.1"N	118°05'25.5"W

BL = Station 1 to Station 3

Buoy	Angle from BL		LATITUDE	LONGITUDE
	#1	#3		
Oscar 2	86.90°	292.77°	33°43'45.3"N	118°05'40.5"W
Oscar 4	48.57°	283.62°	33°43'54.4"N	118°05'37.5"W

# SEAL BEACH SURVEY DATA (continued)

BL = Station 1 to Station 4

Buoy	Angle from BL		LATITUDE	LONGITUDE
	#1	#2		
Echo 1	284.49°	36.10°	33°44'07.7"N	118°05'50.9"W
Echo 2	295.49°	24.92°	33°44'06.7"N	118°05'48.1"W
Echo 3	310.64°	12.33°	33°44'05.7"N	118°05'45.2"W

BL = Station 4 to Station 6

Buoy	Angle from BL		LATITUDE	LONGITUDE
	#1	#2		
Alpha 3	13.87°	266.72°	33°43'59.0"N	118°05'20.7"W
Alpha 4	9.60°	255.32°	33°44'02.0"N	118°05'19.5"W

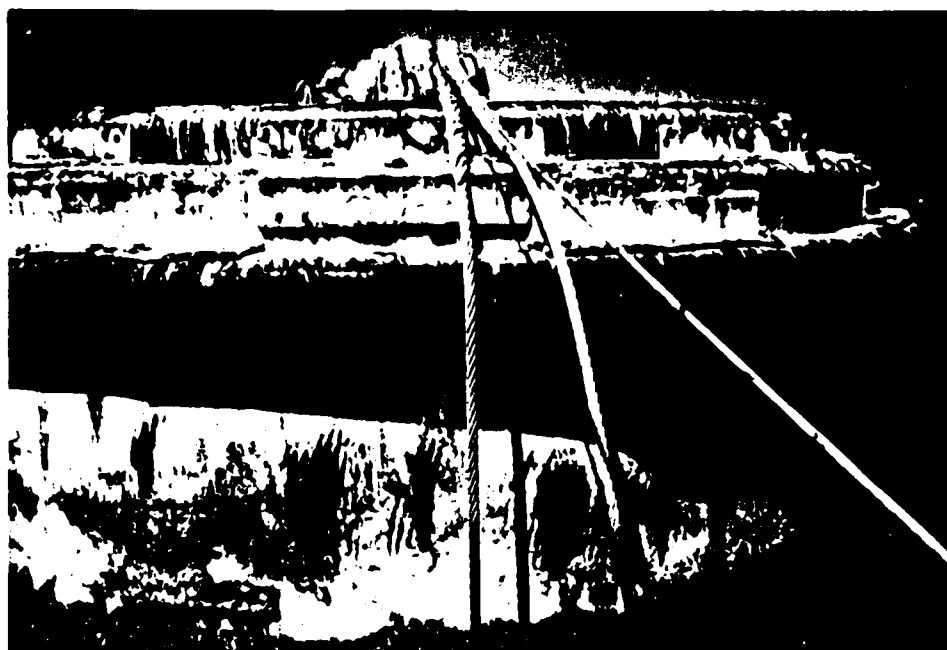
BL = Station 1 to Station 6

Buoy	Angle from BL		LATITUDE	LONGITUDE
	#1	#2		
S. B. Navy Radar Tower	32.35°	241.21°		
S. B. North Water Tower	301.25°	102.06°		

ANNEX C

PHOTOGRAPHS





OSCAR 2. Lower Fender Badly Deteriorated. Deep Scratches and Rust on the Sides.



OSCAR 3. Top Padeye and Jewelry Severely Worn.



Oscar 5. Buoy Listing Severely. Marine Growth  
on Top of the Buoy.



ALPHA 1. Rubber Fender Torn Away from Sides.  
Outer Deck-Edge Chafing Strip Missing.

ANNEX D

PRELIMINARY INSPECTION REPORT



7. REPORT OF THE FINAL EVALUATION WILL FOLLOW. FCC AT THIS  
COMBAND IS C. PENNINGTON AT (202) 453-6600 OR A/V 268-6000  
BT

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